

# Randomized clinical trial to compare the efficacy of two different antimicrobials on cure, milk production, and reproductive performance of dairy cows diagnosed with metritis

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## Introduction

Two systemic antimicrobials are currently labeled in the United States for the treatment of metritis, ceftiofur and oxtetracycline. However, veterinarians may choose an alternative to ceftiofur, a third generation cephalosporin, because of concerns about the potential development of antimicrobial resistance. Ampicillin sodium is often used in an extra-label manner in the field to treat metritis in dairy cows, but there is little work published to support its use for this purpose. The objective of this study was to compare the efficacy of two antimicrobial treatments (ceftiofur hydrochloride versus ampicillin sodium) for resolution of clinical signs, reproductive performance, culling, and milk yield in dairy cows diagnosed with acute puerperal metritis.

## Materials and Methods

Five hundred dairy cows from one 3,000-cow Holstein herd were enrolled in a randomized clinical trial if they had a rectal temperature  $> 103.0^{\circ}\text{F}$  ( $> 39.4^{\circ}\text{C}$ ) and, on the basis of rectal palpation, an atonic uterus with malodorous, watery vaginal or uterine discharge. Cows were randomly allocated to one of two treatment groups: CEF ( $n = 251$ ) received 1.0 mg/lb (2.2 mg/kg) body weight (BWt) of ceftiofur hydrochloride IM, once daily for five days, or AMP (249) received 1.0 mg/lb (2.3 mg/kg) BWt of ampicillin sodium IM, once daily for five days. An additional cohort of non-ill cows (CON;  $n = 470$ ) were matched to treated cows by days-in-milk and parity. Treatment efficacy was evaluated for resolution of clinical signs by six and 10 days post treatment, uterine involution at 33 days post treatment, days to first breeding, days to conception, culling risk, and milk production and reproduction. Milk production, reproductive outcomes, and culling for treated cows were compared to cohort control cows.

## Results

Resolution of fever by six days after initiation of treatment did not differ between the two treatment groups. Ten days after enrollment, the incidence of vaginal discharge did not differ between the treatment groups. Similarly, at 33 days after enrollment, there were no measured differences in vaginal discharge or uterine cervix size between the treatment groups. Average days to first breeding, median days to conception, and services per conception did not differ significantly between the treatment groups. However, cows with metritis, regardless of treatment, had significantly greater days to first breeding, median days to conception, and number of services per conception compared with those for the cohort control cows. Controlling for all evaluated risk factors for milk production, CEF-treated cows had significantly lower milk production compared with that of cohort control cows; whereas, milk production of AMP-treated cows did not differ significantly from that of the cohort control cows at 30, 60, or 90 days-in-milk. There were no significant differences in cows sold or died within 30 days-in-milk among the three groups.

## Significance

Dairy cows diagnosed with acute puerperal metritis that received either ceftiofur or ampicillin IM once daily for five days had no difference in cure rates and had similar reproductive outcomes. If the third generation cephalosporin drugs were removed from the market place, or if veterinarians were concerned about antimicrobial resistance of metritis-causing bacteria, an effective, extra-label alternative for therapy of this potential life-threatening bovine illness is available.